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INTEGRATED FLAMELESS DISTRIBUTED COMBUSTION/STEAM  
REFORMING MEMBRANE REACTOR FOR HYDROGEN PRODUCTION AND USE  
THEREOF IN ZERO EMISSIONS HYBRID POWER SYSTEM

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ABSTRACT OF THE DISCLOSURE

Disclosed is a new process and apparatus for steam re-  
forming of any vaporizable hydrocarbon to produce  $H_2$  and  $CO_2$ ,  
15 with minimal CO, and no CO in the  $H_2$  stream, using a membrane  
steam reforming (MSR) reactor and flameless distributed com-  
bustion (FDC) which provides great improvements in heat ex-  
change efficiency and load following capabilities to drive the  
steam reforming reaction. The invention also pertains to a  
20 zero emission hybrid power system wherein the produced hydro-  
gen is used to power a high-pressure molten carbonate fuel  
cell. In addition, the design of the FDC-MSR powered fuel  
cell makes it possible to capture good concentrations of  $CO_2$   
for sequestration or use in other processes.